Management of Automotive Airbags

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Airbags have been used in American cars and trucks for more than 30 years. They are designed to deploy, or inflate, during moderate to severe crashes, to protect the driver and front seat passengers.

Airbag units contain a sensor, an inflator system and the airbag. The inflator system contains either sodium azide or another chemical propellant and a booster that generates the gas and fills the air bag when it deploys.

Undeployed air bags in vehicles that are recycled present safety and environmental hazards if they are not properly handled. For example, undeployed air bags may inadvertently deploy when untrained workers dismantle a vehicle.

Undeployed airbag units should **not** go through the vehicle recycling (shredder) process. They may react explosively when exposed to heat in an auto shredder. The best management practice is to remove all of the undeployed airbag units before crushing or recycling the vehicles (see links below for information on how to safely deploy airbags). The Department recommends that airbags be deployed only by trained technicians and using appropriate safety protection.

How Airbags Work

Airbags inflate from nitrogen gas generated by propellants and boosters in the inflator system. Until the late 1990's, the propellants consisted mainly of sodium azide, a very toxic and reactive chemical, and potassium nitrate booster, a strong oxidizer. Ignition of the propellant and booster causes the rapid production of nitrogen gas which then inflates the airbag. The airbags are porous, allowing them to deflate after deployment.

Main Chemicals of Concern

Sodium azide, also known as sodium salt of hydrazoic acid, is highly toxic if inhaled, ingested or absorbed by the skin. Violent decomposition occurs when it is heated to 275 degrees C. Sodium azide is highly reactive with heavy metals or their salts, forming heavy metal azides that are shock-sensitive explosives. It is also highly reactive with water and acids, creating hydrazoic acid that is toxic and volatile, and also reacts explosively at high temperatures.

Airbag manufacturers are phasing out the use of sodium azide in favor of more stable and less toxic chemicals. However, these alternative propellants are also hazardous due to their chemical properties.

Some airbag units are equipped with compressed gas inflator systems; these systems may contain explosive substances to release the compressed gas and should be treated in the same way as other types of inflator systems.

How Hazardous Waste Rules Apply to Airbags

- Sodium azide or other propellants that have water reactive, shock sensitive or explosive properties are characteristic hazardous waste because of reactivity (D003). Potassium nitrate and other boosters are characteristic hazardous waste because they are oxidizers (D001).
- If discarded, undeployed airbag units must be managed as hazardous waste, according to the requirements in chs. NR 660 – 670, Wis. Adm. Code: http://dnr.wi.gov/topic/Waste/Laws.html
- Deploying airbag canisters accidently or intentionally is not considered hazardous waste treatment subject to licensing if components of the airbag are recycled separately or with the vehicle. Once deployed, materials from the airbag module, such as scrap metal and plastic can be safely removed for reclamation.

Residual substances from deployed airbags are not hazardous.

- If the airbag canisters are removed for sale as a useable product, they are not considered solid waste and therefore are not hazardous waste.

In addition to regulation under the hazardous waste rules, sodium azide is listed as a storm water pollution source in the Dismantling of Vehicles for Parts Selling and Salvage General Storm Water Permit: http://dnr.wi.gov/topic/stormwater/documents/final_vehicle_dismantling_fs_may_2011.pdf

Seatbelt Pretensioners

Vehicles can also be equipped with seatbelt pretensioners which may contain sodium azide. Vehicle dismantlers are encouraged to deploy or remove seatbelt pretensioners when possible. Undeployed seatbelt pretensioners containing reactive propellants or oxidizers destined for disposal must be managed as a hazardous waste.

How to Safely Deploy an Airbag

Disposal of Air Bags in Scrap Vehicles, 1996, pamphlet, American Automobile Manufacturers Association http://www.pca.state.mn.us/index.php/view-document.html?gid=4053

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